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ARCHIVES OF PEDIATRICS

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JOHN FITCH LANDON, M.D., Editor

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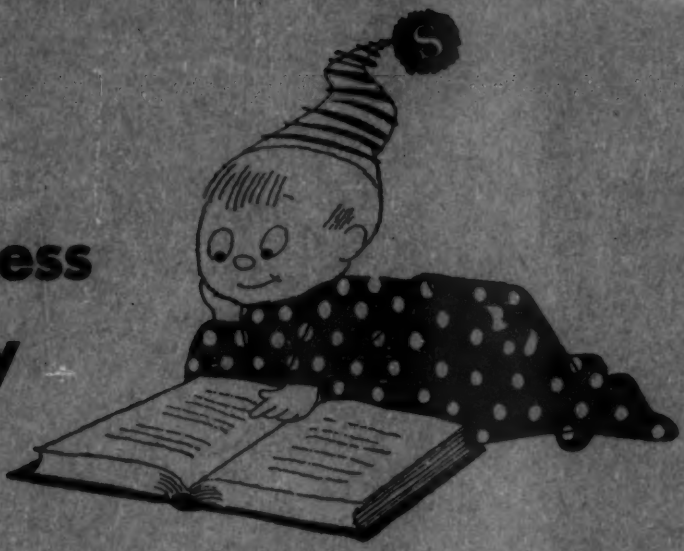

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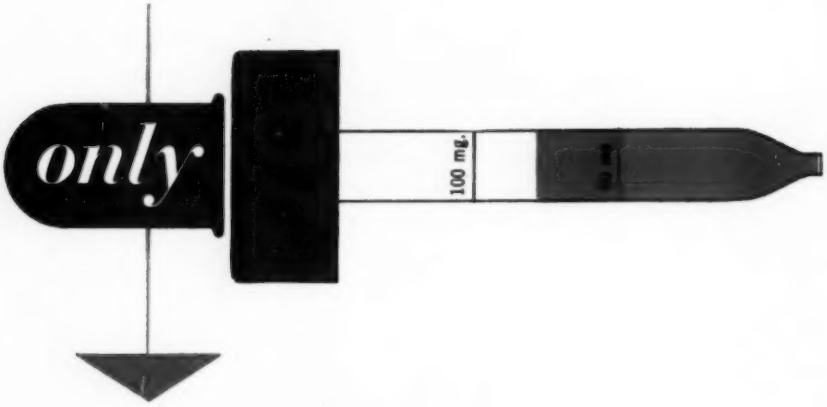

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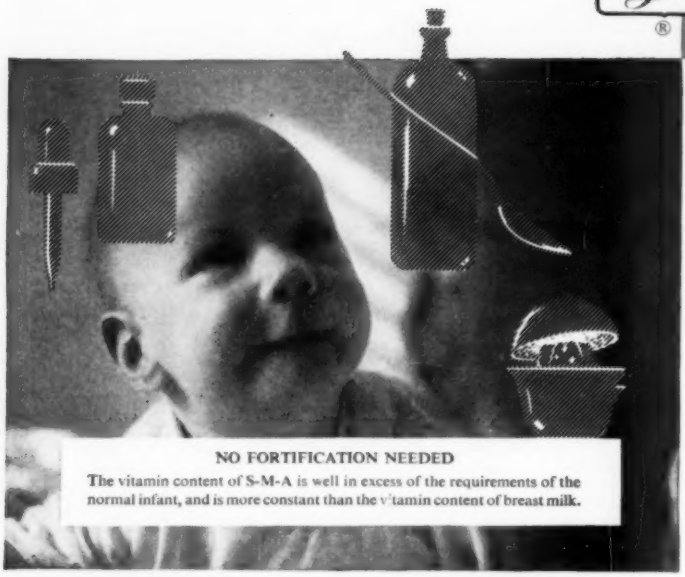

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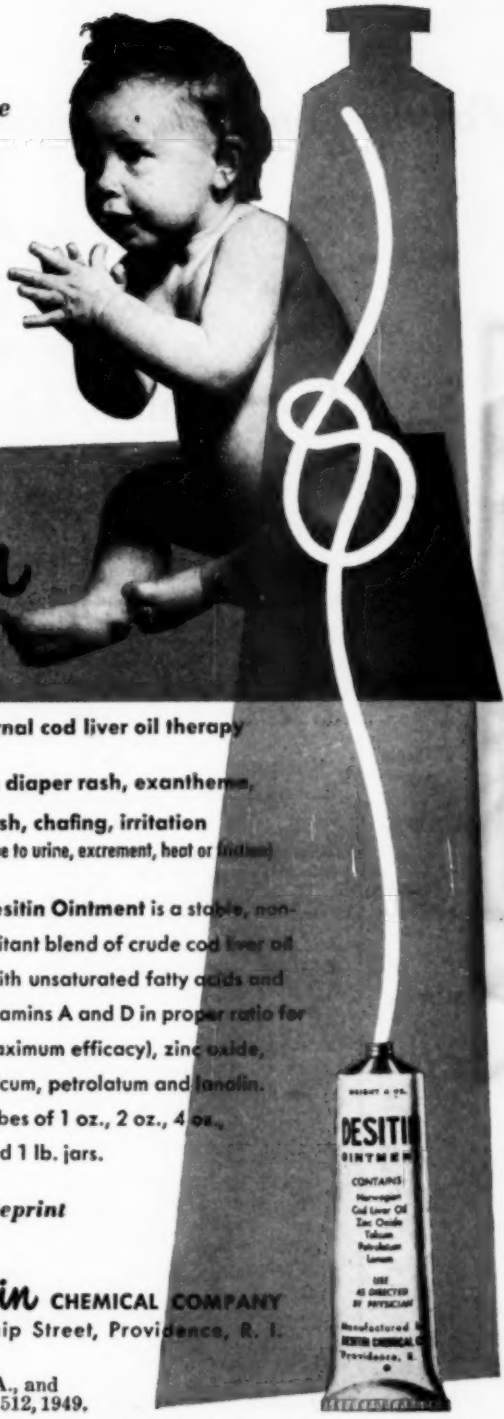

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COARCTATION OF THE AORTA*

REPORT OF CASE

C. P. LYNXWILER, M.D.
SIDNEY SMITH, M.D.
AND
JOHN BABICH, M.D.
St. Louis.

It is not the the intent of the authors to present in this paper the various aspects (etiology, diagnosis, indications for operation, various surgical procedures) of coarctation of the aorta. These topics have been discussed in the recent literature.[1-4] It is felt this case of coarctation of the aorta should be reported primarily because of the infant's age at the time of operation.

CASE REPORT

L. W., female infant. This infant was born on August 12, 1950. Birth weight was 5 pounds 11 ounces. The infant did quite well until the age of 10 weeks when she was admitted to the hospital because of difficult breathing. On admission, the infant weighed 7 pounds 4 ounces; her temperature was 101° F. She was dyspneic; the throat was diffusely injected and there was a mucopurulent discharge from the nose. The infant's liver was palpable just above the pelvic brim. The heart was enlarged and there was a harsh systolic murmur heard over the precordium as well as posterior. The radial pulsations were quite strong; the femoral

*From the Cardiovascular Unit, St. Louis University School of Medicine and St. Mary's Group of Hospitals, St. Louis, Missouri.

and dorsalis pedis pulsations were absent. The blood pressure in the arms was 160/80; the blood pressure in the legs was not obtainable.

TABLE 1. *Preoperative and Postoperative Blood Pressures.*

	Arms	Legs
Preoperative		
10 weeks	160/80	0/0
10½ weeks	170/85	0/0
11 weeks	165/80	0/0
12 weeks	165/80	0/0
———Operation		
Postoperative		
3 days	120/90	110/90
6 days	120/90	100/80
9 days	120/70	100/70
4 weeks	100/70	90/70
6 weeks	100/70	90/75
8 weeks	100/65	90/70

The diagnosis on admission was upper respiratory infection, coarctation of the aorta and heart failure. The infant was placed on digitoxin 0.1 mg. per 3 kg., penicillin and placed in oxygen.

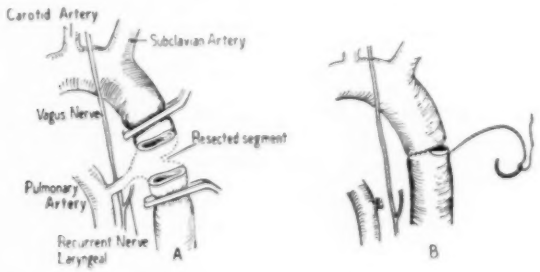

Fig. 2. (a) Line drawing of anatomy at time of operation; (b) surgical procedure carried out.

Electrocardiogram. Rate, 120 per minute; right axis deviation; P-R interval, 0.11 sec.

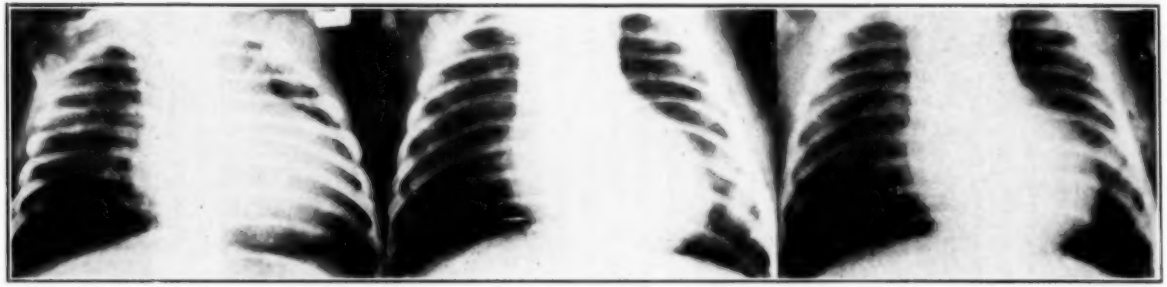

Fig. 1. X-ray of chest, one day prior to surgery, showing marked cardiac enlargement.

Fig. 3. X-ray of chest, four hours postoperative, showing marked reduction in heart size.

Fig. 4. X-ray of chest, three weeks postoperative, showing heart of normal size.

Laboratory. R.B.C., 3.82; hemoglobin, 12.5; W.B.C., 13,400; bleeding time, 4 minutes; coagulation time, 2.4 minutes; sugar, 71; N.P.N., 46.

The infant's response was dramatic and within 48 hours the cardiac decompensation was corrected. The medication was discontinued, except for a maintenance dose of digitoxin daily. During the following two-week-period the infant did well but several x-rays of the chest revealed steady, progressive cardiac enlargement. Fig. 1 reveals the heart size on the day preceding surgery. For this reason surgery was considered and carried out by one of us (S.S.) on November 10, 1950 at which time the infant was three months of age.

Surgery. Fig. 2 illustrates the findings at operation and the surgical procedure carried out. A continuous silk suture was used posterior and interrupted silk was used anterior.

Postoperative Course. The patient was maintained on digitoxin, oxygen and penicillin as well as parenteral fluids. The oxygen was discontinued 48 hours following surgery. Digitoxin and penicillin were discontinued on the seventh postoperative day. The preoperative and postoperative blood pressures are shown in Table 1. The dramatic reduction in heart size is clearly shown by comparison of Fig. 1 with Figs. 3 and 4. This infant was discharged from the hospital during the third postoperative week. Since that time the infant has been seen twice a month in the Pediatric Heart Clinic, Firmin Desloge Hospital. Table 2 shows the infant's weight gain for the first 6 months of life.

TABLE 2. *Infant's Weight from Birth to 6 Months:*

Birth	5 lbs., 11 ozs.
10 weeks	7 lbs., 4 ozs.
14 weeks	8 lbs., 6 ozs.
20 weeks	9 lbs., 12 ozs.
24 weeks	11 lbs., 2 ozs.

SUMMARY

The foregoing is a case presentation of a 3-month-old infant successfully operated on for coarctation of the aorta. To the authors' knowledge, this is the first patient in this age group to be

successfully operated. The authors are of the opinion that the ideal time for operation of a coarctation of the aorta is in childhood. However, in the case reported, it was obvious that medical management was a failure. Therefore, surgery was carried out as a life-saving procedure.

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TUBERCULOUS MENINGITIS AFTER IMMUNIZATION AGAINST TYPHOID. (Zeitschrift für klinische Medizin, Heidelberg, 145:346, Sept. 9, 1950). Auersbach and von Bergmann say that among 18 patients who were treated at their clinic for tuberculous meningitis there were 4 in whom the disease developed after immunization against typhoid. Two of the 4 patients were children, aged 6 and 3 years, and two were young women aged 18 and 16 years. The meningitis became manifest twelve days and eight weeks after the typhoid immunization. Three of the 4 cases terminated in death, and necropsy revealed a caseated primary tuberculous lesion. In 3 of the patients the existence of tuberculosis was not known when typhoid immunization was performed, but 2 patients were known to be allergic to tuberculin, and one of these had had pleurisy three months before the immunization. The authors stress that children and adolescents should not be immunized against typhoid unless the results of their tuberculin tests is known. Typhoid immunization must not be performed if the tuberculin test is positive or if there are clinical and roentgenologic signs of an active tuberculous process. If such signs are absent efforts must be made to ascertain the time of primary infection. Immunization against typhoid must be avoided for four years after the primary tuberculous infection.—*Journal A.M.A.*

ASYMMETRY OF THE GLUTEAL AND INGUINAL FOLDS AS A DIAGNOSTIC AID IN PEDIATRICS*

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The importance of the pediatrician's maintaining a constant watch for asymmetry of the gluteal and inguinal folds in the course of his routine examinations of young infants has been forcibly demonstrated to the writers this past year by the discovery of seven different types of pathologic disorders in infants with asymmetrical gluteal and inguinal folds.

Fig. 1. False asymmetry of median thigh folds—never of any importance.

Judgement of asymmetry of the gluteal folds is very simple. With the child held firmly on his abdomen with the legs extended, an effort is made to line up both the gluteal and popliteal folds of both legs in the same plane. If there is any doubt, the mother supports the child under the armpits, while the pediatrician extends the dangling legs and tries to match the folds on both sides posteriorly. Where there is asymmetry it may be of two varieties: (a) the unimportant accessory folds of the thighs (Fig. 1). In

*From the Pediatric Service of the Bronx Hospital, with thanks to Dr. Wm. Snow and Dr. Alfred J. Bernstein of the Roentgenology Department.

this connection Chapple[1] states: "There may be markedly asymmetrical creases on the medial aspects of the thighs. There may be more on one side, or a discrepancy in number. This seems to have little significance, but it is always worthy of investigation as to cause." The child in the photographs was examined radiographically and found normal. (b) The important folds of the thighs (gluteal, popliteal), may be asymmetrical. (Fig. 2 for folds, popliteal and Fig. 3 for inguinal). This true asymmetry is almost always significant.

Fig. 2. True asymmetry—inguinal and popliteal folds—important.

In our experience, where asymmetry of the gluteal, popliteal or inguinal fold is noted, congenital dysplasia or dislocation of the hips may be found. Thus baby boy K.G. at four months of age was found to show one-half inch elevation of the right gluteal fold and limited abduction on the right side. X-ray (Fig. 4.) shows a supralateral dislocation of the right femoral head with a deformity of the coxo-obturator-femoral line, and a defective oblique acetabular roof. The superior epiphyses of the femora are not demonstrated due to the age of the patient. Incidentally, the film

demonstrates vividly the asymmetry of the gluteal folds, the right being appreciably elevated. The next x-ray, taken after one year

Fig. 3. Inguinal asymmetry—important.

of treatment, shows on the same patient reduction of the dislocation and return of the gluteal folds to normal symmetry.

Fig. 4. Case I. Supralateral dislocation of right femoral head plus deformity of coxs-obturator-femoral line plus defective oblique acetabular roof.

Roentgenology of this condition deserves some consideration If diagnosis is to be made as early as possible, a review of the

subject by the roentgenologist is often of value. Thus Caffey[2] says: "During the first weeks of life, much of the articulating structure is cartilaginous and therefore invisible by x-ray, so diagnosis at this time is very difficult." Later, after the secondary ossification center appears in the proximal femoral epiphyses, the roentgen signs are usually unmistakeable. The femur is displaced cephalad and posteriorly on to the dorsal aspect of the ilium where it usually rests in a shallow depression, the false acetabulum. Associated conspicuous features are the defective oblique acetabular roof and the small shallow acetabular cavity. Since the epiphyseal center of the femoral head does not usually appear until three to six

Fig. 5. Case II. Flexor dislocation of right femoral head plus mild dysplasia without dislocation of left femoral head.

months of age, it is obvious that careful roentgenologic consideration is necessary to avoid overlooking a dislocated hip before six months of age. Grulee and Ely[3] mentioned that "x-ray of the pelvis in the newborn will show a slight triangular shaped and poorly developed acetabulum and in the dislocated hip the distance between the ischium and nearest point of the neck of the femur will be greater than that of the normal." Chapple[4] says: "The acetabulum on the affected side shows defective ossification, as evidenced by the lack of angulation of the acetabular margin. The femur and pelvis are still in normal relationship." Most workers seem to agree with Chapple[4] that in most cases a subluxation exists for a

number of months before true dislocation occurs. In this connection McCune[6] discusses "potential dislocation," characterized by increase in the angle formed by the acetabular shelf with the horizontal plane. He quotes Kleinberg and Lieberman's statement that an angle greater than 30 degrees should be regarded as potential dislocation and treated accordingly with abduction splints, and disagrees, saying: "We know of a number of instances in which infants with a greater angle have not been so treated and have escaped dislocation. Further work is needed to evaluate

Fig. 6. Case III. Soft tissue swelling and gluteal asymmetry, but no bone changes as yet demonstrable.

carefully the acetabular index; infants with a wide angle, who show no displacement of femoral head with no symptoms, should be followed carefully at frequent intervals."

Early diagnosis of congenital dislocation and congenital subluxation is all important "since a retarded and pathologic development of the acetabulum and femoral head occurs[11]." Hart[7] feels that dysplasia of the hip, with delayed and inhibited ossification of all the cartilaginous structures of the hip joint, innominate bone and femur, is the primary state. Secondarily, partial displacement

(subluxation) or complete dislocation (luxation) may occur as sequelae (note Case 2 in which both are present in same patient). He states that neglect of subluxation leads to the chronic subluxated hips of adult life, and neglect of dislocation until weight bearing leads to poor operative results. His earliest clinical observations in the congenitally dislocated hip are Ortolani's sign of the jerk or click, signs due to postural shortening or contracture of the abductor muscles, tendons, and fasciae and femoral head displacement from the acetabulum.

Fig. 7. Case III. One week later—pathologic dislocation hip, periosteal thickening and rarefaction of upper end of bone.

The importance of early diagnosis is evident. Putti[8] claimed complete cure of 119 cases recognized under 12 months of age, achieving these excellent results by an extremely thorough examination of the hips of every newborn infant, justified because of the two per cent incidence in Bologna. The second case (DeCastro) at the age of 15 months was noted to have asymmetry of the gluteal crease, questionable shortening of the right lower limb and a defect in gait when she started to walk. A positive Trendelenberg sign on the right side, telescoping and some restriction of abduction

and external rotation were found. X-ray examination (Fig. 5) showed a flexion dislocation of the right hip but a mild dysplasia without dislocation of the left hip. The acetabular cavity is not fully formed and is shallow.

The third case was that of a young infant (204959) in whom asymmetrical gluteal folds resulted in discovery of a pathological dislocation of the hip. At seven days of age this normally born girl infant showed 103° F. fever, swelling and redness in the left groin. By two weeks of age, the left buttocks was twice the size of the right and asymmetry of the gluteal folds was demon-

Fig. 8. Case III. Another week later—marked bone destruction and production.

strated. The x-ray of the hip (Fig. 6) was negative at this time, but at three weeks of age the x-ray (Fig. 7) showed a pathological dislocation of the hip, periosteal thickening and rarefaction of the upper end of the bone. In spite of huge doses of antibiotics, the process extended, with the next x-ray at four weeks of age (Fig. 8) showing marked bone destruction and production, and large and small loose bone bodies. At three weeks of age the left hip was flexed in an acute angle; there was marked thickening and tender-

ness of the left thigh; the left buttocks was enlarged and the gluteal folds were dissimilar. In spite of the traction and antibiotics this child has had a stormy course with an after-result disappointing in function.

The fourth case is that of a four-month-old girl (O. G.) whose physician gave her a penicillin injection (Romansky formula) for an unexplained fever. The child began to have severe pain in the same side, but the fever disappeared on the third day. A spinal fluid examination, urine examination, blood counts and barium enema x-rays were done to discover the cause of the pain

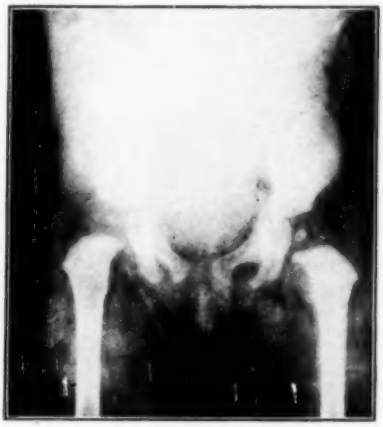

Fig. 9. Case IV. Widening of joint capsule.

but were all negative. Inspection showed marked asymmetry of the gluteal folds, the right knee was held flexed, and forcibly resisted extension, and abduction was markedly limited at the hip. X-rays showed no significant alteration in the joint relationships, but an orthopedist felt that the joint capsule was definitely distended (Fig. 9). Whether this pathology was the infection which caused the original febrile episode, or whether it resulted from the trauma of a penicillin in oil injection piercing the capsule, could not be determined. The child made an uneventful recovery with no treatment.

The fifth case is T.B., three months of age, whose gluteal folds

were markedly asymmetrical, the left knee was flexed, resisting extension, and the left hip difficult of abduction. X-ray (Fig. 10) revealed normal relationships of the hip joints but a small area of rarefaction in the shaft of the femur adjacent to the region of the trochanter was present. This may have been either a small area of bone infection or cyst. This lesion produced a spastic contraction of the muscles with restriction in abduction of the left hip and a secondary pelvic obliquity, resulting in appreciable asymmetry of the gluteal folds. Initially, it was necessary for the

Fig. 10. Case V. Small area of rarefaction in shaft of femur adjacent to trochanter.

orthopedist to do a manipulation to stretch the tightened abductor muscles and to correct the pelvic obliquity. The cast was then applied to retain this position. After eighteen months of treatment the child seems perfectly normal, and the x-ray shows no rarefaction. In view of the subsidence of the process it was considered that the findings apparently represented bone infection.

The sixth case, R. O., was the second cousin of the fifth case. Asymmetry of the gluteal fold was noted early and x-rays (Fig. 11) at four months of age were completely negaitve. Difficulty in walking, at one year of age, and a mild limp resulted in a diagnosis of "spasm of the psoas and gluteal muscles," which

was treated by brief application of a cast by an orthopedist. Follow-up one year later has shown a perfect result. This type of case, with negative x-ray findings, resembles the group one of us[9] previously reported under the title "Pseudo-congenital Dislocation of the Hip." At that time the question of the existence of long capsular ligaments on one side, or increased intracapsular fat and tissue on one side, was raised as the possible cause of the asymmetrical gluteal folds. In addition, any pathology of the spine, or psoas or gluteal muscles, must be thought of.

The seventh case, M.F., a girl seven months of age, presented a marked gluteal asymmetry, although x-ray (Fig. 12) of the

Fig. 11. Case VI. Normal.

hips and lumbosacral spine were normal, except for a pelvic tilt, downwards on the left, producing a relative lengthening of the left lower limb. The orthopedist's explanation for this phenomenon is that of a habitual pelvic tilt, asymptomatic, and which can be corrected by manipulation. It can be corrected by pushing proximally on the extended left leg and pulling distally on the right leg. There may be some increased tightness of the quadratus lumborum on the right side. No other abnormality is usually found other than the pelvic tilt. These passive maneuvers resulted in a complete correction of the tilt within a few months. In retrospect, this tilt may have been one of the "positions of comfort" described

by Chapple although it is unusual to be seen at such a late date, that is seven months. In many of these cases spontaneous recovery within one or two years occurs even without treatment.

At this point, mention must be made of the feeling among orthopedists that all infants should have x-rays of the hips routinely as Putti had recommended long ago. They make the point that asymmetry of the gluteal folds may be found fairly frequently in normal hips, and the folds may be perfectly symmetrical in many children with dysplastic acetabulum. Both of these clinical impressions may prove to be true, but in the absence of routine hip x-rays asymmetry of the folds has uncovered much pathology.

Fig. 12. Case VII. Pelvic tilt plus some slight dysplasia of right side.

SUMMARY

Seven cases have been presented which were observed in the course of one year, in which the clue to pathology was given by the discovery in the routine examination of infants of asymmetry of the gluteal, popliteal and inguinal folds. The diagnosis, in order of presentation:

1. Congenital dislocation of the hip.
2. A dysplastic hip.
3. A pathologic dislocation of the hip.

4. A synovitis of the hip joint.

5. An infection of the upper aspect of the shaft of the femur with spastic contracture.

6. A spasm of the muscles about the hip joint.

7. An habitual pelvic tilt.

A plea is made for pediatricians to use this valuable diagnostic sign routinely.

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PENICILLIN IN CONGENITAL SYPHILIS. (Medizinische Klinik, Munich, 45: 1133, Sept. 8, 1950). Reinhard treated 23 children with congenital syphilis with penicillin. Infants aged up to 6 months were given 20,000 units by mouth every two hours for seven and a half days, with a total dose of 1,800,000 units. Infants between the ages of 6 and 12 months were given 30,000 units by intramuscular route every three hours for seven and a half days, with a total dose of 1,800,000 units. Children aged over 1 year received 50,000 units by intramuscular route every three hours for seven and a half days, with a total dose of 3,000,000 units. The only side reaction at the start of treatment was rise of temperature to near 40° C. (104° F.). Syphilitic lesions of the skin and mucous membranes disappeared rapidly. Regression of recent roentgenologic bone changes required two to four months, depending on the severity of the lesion. Serum reaction of the patients became negative within several months after discontinuation of treatment. Negative serum reactions could not be obtained, or with difficulty only, in patients in whom treatment was instituted several years after birth. Recurrences had not been observed when the report was written.—*Journal A.M.A.*

IS THE PUBLIC HEALTH LAW RESPONSIBLE FOR THE POLIOMYELITIS MYSTERY?

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After 43 years of intensive and expensive research on the virus theory as cause of poliomyelitis, the failure to explain the disease calls for reappraisal of the problem. "If there is adequate understanding of conditions, there is less occasion for guessing," Swayze[1] stated concerning poliomyelitis 41 years ago and this fact is obviously applicable today.

The first, and by all means the foremost fact that must be conclusively established is whether or not poliomyelitis is actually an infectious contagious disease, as has been commonly assumed and stated in the public health law. This assumption, it must be admitted, is almost entirely based on the results of animal experiments rather than on clinical investigations. Simon Flexner[2], in 1911, stated: "We have progressed very far in the management of an infectious disease when we have learned the portals of egress and ingress of the infectious agent. Such knowledge of this kind as we possess regarding epidemic poliomyelitis is based wholly on animal experiments, and hence the degree of application to human beings has still to be established." Yet, in 1951—40 years later—nothing is definitely known regarding the portal of entry into the human body of the so-called virus of this disease, and conclusive proof that a virus actually enters the human body under natural circumstances from without is conspicuously lacking.

The writer[3, 4] has found that in the past no less than 200 names have been applied to poliomyelitis and has pointed out the existence of epidemics of it years ago. Some of our foremost clinicians of half a century ago made it known that they had been cognizant of the disease many years before. Furthermore, many stated that they had not considered it to be infectious or contagious. At the time that a Report of the Special Committee on Anterior Poliomyelitis[5] was read to the members of the American Orthopedic Association and the American Pediatric Society, April 28, 1911, the following comments were made regarding the prevalence of the disease and its communicability in previous years. Chapin[5] stated: "There is one aspect of this disease of considerable interest.

Years ago we never thought of contagiousness with reference to it." Acker[5] stated that he had seen no cases of contagion. "If the disease is so contagious," he said, "I do not understand why the nurses and mothers would not have been infected." Crandall[5] pointed out that he had seen his first cases of poliomyelitis 23 years previously and Morse[5] stated that his first cases went back about 17 years, and a diagnosis of rheumatism had often been previously made on account of the pain. Koplik[5] pointed out that today cases are included that were formerly not recognized as poliomyelitis.

Lovett[6] (1911) indicated that poliomyelitis had been known for a long time to contemporary physicians when he stated: "That infantile paralysis has existed in the United States for an indefinite time is perfectly familiar to us from the fact that we all know of adults affected whose history would reach back fifty years."

In a letter addressed to every children's hospital in this country, Adams[5] asked a certain number of questions, among which was: "Have you ever had a case of poliomyelitis originate in the hospital, or have you any evidence that the disease has spread from patients admitted to the hospital?" As to the disease originating in the hospital, the invariable reply, he says, was, "No."

Sachs[7] (1911) indicates that he was familiar with poliomyelitis before it was generally realized that it occurs in epidemics and that it was not generally considered to be infectious. He says: "Many years ago those of us who were in charge of hospitals and dispensaries had observed the seasonal occurrences of the malady, the early spring and summer being the periods of the year in which the onset of the disease had been most commonly observed. Some ten or fifteen years ago the opinion was hazarded—among, others by the writer—that the disease should be considered one of the infectious diseases of childhood, but this opinion did not gain a firm foothold until the epidemic occurrence of the disease in Norway and Sweden in the late nineties and the early years of this century. Thereafter, a more careful review of the entire subject showed that earlier epidemics had been reported in Europe and in America. . . . But we were not fully alive to the importance of the subject until the epidemic in Greater New York in 1907."

Sachs points out: "Our present knowledge of the possible methods of contagion is based almost entirely upon the work done in

this city at the Rockefeller Institute." This of course placed reliance on animal experiments rather than on clinical investigations. Sachs states that children afflicted with the disease were kept in general hospital wards and that not a single one of the other inmates of the wards of the hospital was affected with the disease.

Simon Flexner[8] (1910) stated: "It was not easy to establish in an individual case precisely how the disease was acquired; it was difficult to bring evidence that was at all convincing that this disease was contagious." L. Emmett Holt[8], in discussing Flexner's paper, stated: "Even five years ago if anyone had suggested that the disease under discussion was an infectious or a contagious one, it would have been looked upon as a joke."

If poliomyelitis was not considered to be an infectious contagious disease a half century ago by outstanding clinicians, we must determine why it has come to be considered infectious since that time. The answer to this reversal of thought concerning the nature of this disease is to be found in the period of medical history between the years 1905 and 1911.

Although an extensive epidemic of poliomyelitis had occurred in Vermont in 1894, that was described by Caverly[9], no extensive outbreak of the disease aroused widespread attention in this country until the 1907 epidemic occurred in New York and Massachusetts. Caverly had stated emphatically 13 years before: "There was a general absence of infectious disease as an etiologic factor in this epidemic. The element of contagion does not enter into the etiology either. I find but a single instance in which more than one member of a family had the disease and it usually occurred in families of more than one child and as no efforts were made at isolation, it was very certain it was non-contagious." Yet, in 1907, and in subsequent years, every effort was made by the New York City and Massachusetts Health Departments to show that poliomyelitis was an infectious, contagious disease. The general attitude at that time appears to be expressed by Sachs[10] when he says: "In general, the epidemic occurrence of any disease is sufficient to prove its infectious or contagious character." It is significant to note that at about this same period in medical history that the infectious and contagious nature of pellagra was also suspected because it occurred in epidemics and convincing evidence to prove this contagion concept was presented by the Thompson-McFadden, Illi-

nois, and Texas Commissions appointed to study the problem. Harris[11] "proved" the disease to be caused by a virus and Tucker[12] concluded from clinical and pathological studies that pellagra is a virus disease. It was, of course, unknown at that time that pellagra is a vitamin deficiency disease and can occur in extensive epidemics.

In 1907, the insistence that poliomyelitis must be a specific infectious disease arose chiefly from the fact that an epidemic of the disease was prevailing. The discovery of the so-called virus of poliomyelitis had not as yet been announced. Epidemics of poliomyelitis, designated by other names, had existed before, but as Manning[13] (1911) states: "The tardy recognition of the epidemic character of poliomyelitis in the last century resulted in a very limited written history or, as we say, epidemiology of the disease."

The attention in this century of the medical profession and the public had never been so focussed upon a disease as it was upon poliomyelitis during the epidemic of 1907, as the considerable amount of discussion given to it in both the public and medical press indicates.

A Collective Investigation Committee of the New York Neurological Society[14], with the cooperation of the committee appointed by the Section on Pediatrics of the New York Academy of Medicine, and the New York Board of Health, was appointed to investigate this epidemic of 1907.

One of the first steps taken by the committee was to send out return postals to the physicians of Greater New York and vicinity, inquiring whether or not the physician in question had seen cases of infantile paralysis during the summer and autumn of 1907. Inquiry blanks were sent to those physicians who replied and these contained certain leading questions. The committee concluded from the returned blanks that poliomyelitis was infectious but not a contagious disease.

The initiative having been taken in New York, the Massachusetts State Board of Health[15] started an investigation to determine the etiology of poliomyelitis modelled after the New York investigation. Receptacles were sent out to physicians reporting cases for collection of stools in order to investigate the gastrointestinal tract as a possible source of infection of the disease.

This investigation, although producing no bacterial evidence of its etiology, nevertheless, not only focused the attention of the medical profession on poliomyelitis as a disease entity but likewise strongly conveyed the idea that the disease was infectious in nature. An editorial in the Boston Medical and Surgical Journal[16] (Sept. 12, 1907) points out this fact when it says: "Taking it as a highly probable point that the disease is due to a specific germ, a circular has been prepared to be sent out to physicians generally, in which a request is made for such reports as would do much toward establishing at least the usual surroundings in which the disease occurs most frequently and thus afford some idea of the conditions favorable to the development and growth of the supposed morbific organisms."

For the first time in the United States the attention not only of physicians but the public as well was focussed on a vast scale on poliomyelitis as a possible infectious contagious disease. Although there was admittedly no conclusive proof of its contagiousness, the general attitude at that time is summed up by Strauss[17] (1911) as follows: "It seems to us despite the lack of absolute proof, that the best interests of the community would be conserved by our regarding the disease from a contagious standpoint."

In May 1910, a joint committee[5] was appointed by the American Orthopedic Association and the American Pediatric Society to communicate to state Boards of Health and other health authorities with regard to anterior poliomyelitis. Circulars were sent to the medical journals and letters to the health commissioners of each state and to each provincial health officer of Canada. These letters urged the physicians and health authorities to study and quarantine the disease, and the journals gave publicity to most of these circulars. The letters to the health officers requested them to take notice of the serious character of the epidemics, the spread of the disease and its contagious nature, and asked them to make the disease reportable and to undertake a field study of epidemics.

By that time poliomyelitis had been made a reportable disease in 23 states and in Ontario and British Columbia. The Committee recommended that the disease be made reportable in all states. It recommended further that all cases be quarantined, sputum, urine and feces be disinfected, and the same rigid precautions adopted as in scarlet fever.

DISTRIBUTION OF
INFANTILE PARALYSIS
IN UNITED STATES
IN 1910
LEGEND
DISEASE REPORTABLE BY LAW. NOT REPORTABLE IN OTHER STATES.
(F) - FROM A SERIES BY FROST
(EST.) - NUMBER OF CASES ESTIMATED
± - APPROXIMATE.
BRITISH COLUMBIA
ALBERTA
ONTARIO
QUEBEC
NEWFOUNDLAND
1
75
11
PRESENT
300
OREGON
112
MONTANA
170 (EST.)
NORTH DAKOTA
150
SOUTH DAKOTA
86
179
IDAHO
96(F)
WYOMING
RARE
1000
370 (EST.)
43
225
CALIFORNIA
NEVADA
9
(09-10)
UTAH
120(EST.)
COLORADO
9 (F)
NEBRASKA
50
IOWA
651
KANSAS
198
MISSOURI
174
ILLINOIS
137 (F)
INDIANA
500 (EST.)
OHIO
52(F)
1000+
210 (EST.)
48
845
R.I. 23(F)
168
70(09-10)
DEL. 8
MD. 300(EST.)
HAWAII
33
100
ARIZONA
30 (EST.)
NEW MEXICO
NONE KNOWN
TEXAS
FEW
20
ARKANSAS
NO. INF.
50±
RARE
KENTUCKY
FEW
TENNESSEE
NONE KNOWN
FEW
350
FEW
85(F)
FEW
FEW
19
CANAL ZONE
1 (WHITE)
PORTO RICO
ABSENT

Fig. 1

In the same year (1910), Swayze[1], Professor of Obstetrics and Dean of the Medico-Chirurgical College of Philadelphia, stated that he had received a printed official postal from the Department of Health, over the signature of the Chief Medical Inspector, commanding that he make immediate report of each and every case of anterior poliomyelitis occurring in his practice in the same manner that other communicable diseases are reported to the health authorities. "This arbitrary demand cited infantile paralysis as a contagious affection although bacterial research failed to back up the assumption." In substance, Swayze's reply to the Chief Inspector declined to accept the theory of contagion. In response he received an official envelope containing a duplicate card desiring reports "in the same manner as other communicable diseases" and hoped it was satisfactory. Swayze replied to the effect that the conclusion of contagion was *not* satisfactory and the incident was closed. In his article, "The Infantile Paralysis Muddle," in which this exchange of correspondence appears, Swayze offers evidence that poliomyelitis is simply solar heat prostration. This concept[18] had been considered before and after that time to explain certain cases of this disease. The lesson to be learned from Swayze's insistence that infantile paralysis is not a contagious disease is that, nevertheless according to the law, it is a contagious disease, and that it is illegal to consider it otherwise. The law, clinical observations to the contrary, has to be considered. Poliomyelitis is unique in that it is the only disease in the history of medicine in which a theory, and not an established fact as to its cause, has become incorporated into the public health law.

The year 1910 also showed other intensive efforts not only to gather information regarding poliomyelitis but to imply that it was an infectious contagious disease. The Massachusetts State Board of Health sent out several hundred letters of inquiry to state boards of health, to officers of state medical societies and to prominent physicians in various parts of this country, its dependencies, and Canada.

Statistics reported by Lovett[6] (1911) show the results of this survey. A map of the United States (Fig. 1), on which is marked the number of cases for 1910, showed a total of 8,700 cases. These were the cases of poliomyelitis that were officially reported, in some cases estimated, but this estimate was a poor criterion by which to

judge the total number that had occurred during the year. In half of the states the disease was not as yet reportable; in the states where the disease was reportable, many cases were either unrecognized or unreported when recognized; in other states the alertness of physicians is evident from the number reported. A study of the map, however, shows the widespread and general distribution of the disease after the attention of physicians had been called to it. Obviously poliomyelitis had not spread to the various states indicated. It is equally obvious that diseases which had doubtless been designated by other names in the past were now being reported as poliomyelitis. The known existence of cases of a paralyzing disease such as poliomyelitis, might excite public panic and this understanding may have deferred physicians from making known the prevalence of such cases in the past.

If one takes into consideration the evidence that in 1910 there were officially reported cases of poliomyelitis in the United States in only one half of the states, and that early, mild, or nonparalytic cases that are now reported were not considered to be this disease at that time, it is fair to assume that extensive epidemics existed then and perhaps as great as those of today. To continue the assumption, we may conclude that the incidence of poliomyelitis may not have increased after all, as is commonly supposed.

Collins[19] (1910) made a plea in a paper read before the Association of American Physicians on May 2, 1910, that poliomyelitis be made a reportable quarantinable disease. He based his arguments of contagiousness on the prevalence of epidemics of this disease and on circumstantial evidence. He stated in regard to the so-called poliomyelitis virus: "From a study of the disease clinically, no information has been obtained as to how the virus gains entrance into the system." This point has not been conclusively established even at this date, 41 years later, despite intensive research.

On May 30, 1910, the Academy of Medicine of Paris, France[20], appointed a commission to discuss the expediency of classifying poliomyelitis, or infantile paralysis, among the diseases in which notification is obligatory. The Commission reported to the Academy at its meeting on July 11, 1910, that the disease was first made notifiable in Sweden and Norway in 1905, and that similar action had been taken by many of the North American and Aus-

trian states, and throughout the German Empire. The Commission, therefore, recommended compulsory notification of poliomyelitis in France, quarantine of suspects, patients and convalescents, and subsequent disinfection of premises. These recommendations were adopted.

From this beginning in the period of medical history from 1905 to 1911, poliomyelitis eventually has become throughout the world not only reportable, but according to the law, an infectious contagious disease. From the time that compulsory reporting of poliomyelitis was adopted as a public health measure in certain localities up until the present time when such reporting is universal, the implication that poliomyelitis is an infectious contagious disease has been included in the public health law. If it had been made reportable only and no suggestion as to its possible etiology had been implied in the law, unlimited research would have undoubtedly been carried out during the last half century and the mystery surrounding the disease would probably have been solved.

COMMENT

Although poliomyelitis is legally a contagious disease, which implies that it is caused by a germ or virus, every attempt has failed conclusively to prove this mandatory requirement of the public health law. The manifest truth that we must take into consideration is that progress in poliomyelitis investigations has been impeded by this prematurely formulated public health law. Hoyne[21] (1951) recently summed up our cumulative knowledge of poliomyelitis since it was made a reportable contagious disease as follows: "Notwithstanding the intensive studies of investigators, very little information of practical value has been added to our knowledge of poliomyelitis during the past forty years."

Hoyne points out, as others have also indicated, the rarity for a patient to give a history of exposure to a known case of poliomyelitis; the prevalence of epidemics of this disease in the summer, whereas nearly all common acute infectious diseases occur in seasons when life is principally within doors and schools are in session; the warm weather prevalence which is unusual for a communicable disease; and the inability to prevent poliomyelitis according to the standards employed in preventing known infectious diseases. He then makes the startling revelation that the etiologic agent of the disease is still unknown.

Unlimited poliomyelitis research ceased abruptly when this disease was legally made a communicable disease. However, definnite progress toward a solution to the problem was being made before the public health law made poliomyelitis legally a germ or virus disease. For example, it was reported by toxicologists and bacteriologists that poliomyelitis could be produced both by organic and inorganic poisons as well as by bacterial toxins. The relationship of this disease to beriberi was also being given consideration. However, these investigations lost support when a germ or virus came to be considered by some to be the full and final answer to the problem. Funds for poliomyelitis research were from then on designated for the investigation of the infectious theory only.

Nevertheless, there are today many investigators who have strong evidence contradicting the infectious theory. Vitamin and mineral deficiency, poison, allergy and other theories are being presented to explain the mystery, but these men, because of the public health law and the limited ability to obtain funds or cooperation from any source cannot work freely on the problem of cause of poliomyelitis.

What Louis Bromfield[22] states about research in agriculture in his book, "Out of the Earth," could obviously apply to poliomyelitis investigations if unlimited research were encouraged. He says: "In the long history of mankind, the tiniest observation or speculation of the most humble men (and all really great men are humble in the face of Nature) has sometimes led to vast and dynamic discoveries of the utmost importance to man. Many of the greatest contributions to agriculture in our time have not come from the billion dollar Department of Agriculture nor from the countless Colleges of Agriculture but from a county agent or a farmer who had the power to observe, the imagination to speculate and the logic to deduce a process from which vast benefits have developed. . . . Each day brings forth some new discovery which completely pulls the carpet from under theories which in the past were accepted as facts. It is not impossible that many accredited theories of today may join the exploded superstitions of yesterday." Bromfield points out that circumstances and an apparently impregnable chain of circumstance threw the investigator off the real track. Although he indicates that the pendulum has not infrequently swung in agriculture from one theory to another that provided the full

and final answer to the problem, however, in poliomyelitis investigations it has been impossible for the pendulum to move perceptibly because of the public health law.

The mother, general practitioner, country doctor and clinician have all made important observations during epidemics of poliomyelitis and have formulated their own theories regarding the cause of the disease. However, they have been unable to have these observations seriously considered, especially when they have disagreed with the orthodox concept of the cause of the disease. This situation is admittedly unfortunate since our fundamental knowledge of the disease, as incorporated in the public health law, has originated from laboratory workers experimenting on animals that are not naturally susceptible to poliomyelitis. Jelliffe[23], 32 years ago, cautioned: "The purity of laboratory experimentation is rarely repeated in nature."

Shaw and Thelander[24] (1949) emphasize these facts when they state: "The clinician has not been presented with any sound doctrine regarding its epidemiology and transmission, its precise pathogenesis, or the details of diagnosis and treatment. The clinician who observes the only animal naturally subject to this disease, must develop his own credo regarding most of the aspects of the human form of the disease including not only details of management of the affected patient but also the many hypothetic considerations which influence one's judgement during epidemics."

Shaw and Thelander indicate in the above statement that poliomyelitis is entirely out of the hands of the clinician, a fact that Sachs[25], 41 years before, had also intimated.

At one time or another the classical dietary deficiency diseases, beriberi and pellagra, and even sunstroke, have been considered to be communicable infectious diseases. If by law any one, or all of these diseases, had been made a reportable communicable disease, it is obvious that today it would legally be a germ disease and a search for the causative germ might still be in progress. If beriberi and pellagra had been made reportable communicable diseases, it is conceivable that the epochal studies on vitamins by Funk and subsequent workers could have been ignored in the search for the infectious agent as the etiological factor in these diseases. The progress of medicine would have been seriously retarded.

Yet, in poliomyelitis investigations the continued attempts—unsuccessful to date—to show that a so-called virus enters the human

body under natural circumstances to cause the disease go on over the objections of those who maintain that the so-called virus is not the cause of the disease but rather an endogenous product arising secondary to poisoning, vitamin or mineral deficiency, etc. and despite the protests of the public who demand that all possible causes of poliomyelitis be investigated.

A virus theory has been considered as an etiological factor in relation to other diseases, notably cancer[26], and convincing evidence has been presented to support this hypothesis. Nevertheless, research goes on in this study of cancer cause along many lines of investigation which *include* the virus theory rather than on virus studies only, excluding other theories, as in the investigation of poliomyelitis. If, however, cancer were incorporated in the public health law as a reportable communicable disease as a result of these laboratory studies, it is obvious that unlimited research would cease and that those who maintained noninfectious theories to explain the cause of the disease would neither be able to obtain funds for extensive research nor cooperation for investigating their ideas.

The time is long past due for careful reappraisal of the poliomyelitis problem and for many capable workers with various opinions regarding the cause of the disease to be given the opportunity to work and the funds with which to work. The implications of the public health law that poliomyelitis is an infectious communicable disease must be reconsidered if progress is to be made.

SUMMARY

1. Reappraisal of the poliomyelitis problem is called for on the basis of the failure of the virus theory of cause to explain the disease adequately after 43 years of intensive and expensive research.

2. Poliomyelitis was known to physicians in past generations but its epidemic character was not fully appreciated until relatively modern times.

3. The tardy recognition of the epidemic character of the disease aroused the suspicion that poliomyelitis was an infectious contagious disease although it had not been generally regarded as such in the past.

4. Intensive efforts were made from 1905 to 1911 to acquaint physicians with the disease after its epidemic prevalence was fully

realized and exhaustive, but unsuccessful, efforts were made to prove it to be an infectious contagious disease.

5. Without conclusive proof of its infectious nature or its contagiousness, poliomyelitis was made a reportable communicable disease by a prematurely formulated public health law implying that it is caused by an infectious agent.

6. Although unlimited poliomyelitis research was under way in other fields, notably toxicology, with results that offered promise, research was limited to only one line of investigation—the infectious theory—after the public health law was established.

7. A virus theory has been proposed to explain other diseases, notably cancer, and convincing evidence has been presented to support this hypothesis. However, research goes ahead in this field of medicine along many lines of investigation that *include* the virus theory but does not, as in poliomyelitis studies, exclude other possibilities.

8. The implications of the public health law that make poliomyelitis legally an infectious communicable disease must be reconsidered if progress is to be made.

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AUREOMYCIN IN THE TREATMENT OF PERTUSSIS*

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Amongst infectious diseases, whooping cough is notorious in that it has resisted all known chemotherapeutic and most of the antibiotic drugs. This is unfortunate since the disease, particularly in infants and younger children, exacts a high immediate mortality, its sequalae lead to much chronic invalidism and ultimately to wastage of life.

The advent of aureomycin was hailed with enthusiasm. It was, until the introduction of terramycin—which threatens perhaps to dethrone it—rightly claimed to be the most versatile antibiotic.

It has been shown[1] that aureomycin has a bacteriostatic effect on H. pertussis in vitro and can protect mice against the organism instilled intranasally. Bell et al.[2] concluded that the course of human pertussis is favorably modified by aureomycin. They state that in many cases, when the drug was given early enough, prompt recovery followed in a few days; in other cases, the course of the disease was shortened. Chang et al.[3] treated 22 bacteriologically proved cases of pertussis, of which approximately 80 per cent were under three years, and noted improvement as shown by a shorter duration of the paroxysmal stage and diminution in the number of paroxysms. They used a dose of 100 mgs. per kgm. per day for 10 days (subsequently reduced to 60), administered in 4 equal doses Miller et al.[4] obtained rapid recovery of 6 patients who were virtually free of symptoms (i.e. paroxysms of coughing) by the 7th-10th day after the start of aureomycin; they gave a big dose of 350 mgs. per kgm. per day for 8-10 days.

In view of its efficacy in infections caused by gram-negative organisms and of the favorable reports attending its use in whooping cough the following investigation was undertaken.

Material. Fifty-three cases were selected. The age varied from under three months to nine years. More than half of the cases were under two years (twenty-nine cases) and of the total, about

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a third (eighteen cases) were under one year; two cases were under three months.

The duration of the disease was sometimes difficult to determine. Cases in which a spasmodic cough was present for more than three weeks were excluded and only one case included in which such occurred for three weeks. Thirty-two cases were in the first week of the spasmodic stage; fifteen in the second week. Five cases were in the catarrhal stage; in these a history of contact and/or the subsequent course substantiated the diagnosis. The disease was of all grades of severity. The severity was gauged by the number of paroxysms per day, the average duration of the paroxysm, and the occurrence of vomiting, cyanosis and convulsions. Eighteen cases were mild, twenty-four severe and eleven very severe cases, two of the latter being associated with convulsions. As would be expected most of the severe cases fell into the younger age group. In one case only was there a history of vaccination against pertussis. Seven cases were complicated with bronchopneumonia at the start of treatment.

Diagnosis. For some reason, obscure to us, we consistently failed to isolate H. pertussis, either by the cough plate method or by the nasopharyngeal swab. Reliance has therefore to be made on less direct evidence.

Except in complicated cases, the erythrocytic sedimentation rate was normal and the white blood count showed an absolute and relative lymphocytosis. A typical cough and a history of contact were confirmatory.

Dosage. Different dosage schedules were tried. The first group (A: 3 cases) had a total dose of half the weight in grams spread over four days preceded by a loading dose of 100 mg. per kgm. In the second group (B: 14 cases) half the weight in grams was given over a period of seven days; eight cases had a loading dose of 100 mgs. per kgm. body weight. In the third group (C: 25 cases) a loading dose of 20 mgs. per kgm. body weight was given followed by 50 mgs. per kgm. per day for eight days in twenty-one cases, and for eleven days in four cases. Finally, eleven cases (Group D) had 125 mgs. per kgm. body weight, for four days; in eight of the cases a loading dose of 100 mgs. per kgm. body weight was given. Antispasmodic drugs were withheld and in all cases a period of observation for about three days prior to treatment was enforced.

Administration. In view of the unstable nature of aureomycin mixtures and of its bitter taste, the drug was freshly prepared in solution with gum accacia, spirit menthis, syrup and water. The drug was given 6 hourly round the clock. In two of the severe cases, in which vomiting precluded oral therapy, the drug was given rectally (through a catheter) in double the oral dose.

Results. A case was considered cured if at the end of the course of treatment an insignificant nonspasmodic cough was present. Failure designated a case that did not improve or that relapsed after a satisfactory improvement for a few days. By great improvement is meant significant reduction in the daily number of paroxysms and/or the duration of each paroxysm and consequently in the diminution or disappearance of the vomiting, cyanosis and convulsions; slight improvement is said to have occurred when there is definite but not considerable reduction in the number and duration of the paroxysms.

Adopting these criteria, it can be seen that in fully twenty-one cases the treatment failed to influence the disease, one case was cured, eleven cases were slightly improved; twenty cases greatly improved.

Table 1 shows the result of treatment in relation to dosage schedules.

TABLE 1.

	Cured	Greatly Improved	Slightly Improved	Failed
Group (A)				
L. D. 100 mgs./kgm. Then total dose of ½ wt. in grams over 4 days	..	1	1	1
Group (B)				
(a) L.D. 100 mgs./kgm.	..	..	3	5
(b) L.D. Nil. Then total dose of ½ wt. in grams over 7 days	..	4	..	2
Group (C)				
L.D. 20 mgs./kgm. then 50 mgs./kgm. day for				
(a) 8 days.	..	12	3	6
(b) 11 days.	..	..	2	2
Group (D)				
(a) L.D. 100 mgs./kgm.	1	3	1	3
(b) L.D. Nil	..	..	1	2
Then 125 mgs./kgm./day for 4 days				

It is significant that the only cured case occurred in group D and yet even in this group more than half the cases either failed to improve or were only slightly made better.

Table 2 shows the result of treatment in relation to severity of the disease.

TABLE 2.

Intensity	Cured	Greatly Improved	Slightly Improved	Failed
Mild	1	3	3	9
Severe	..	10	6	9
Very severe	..	7	2	3

Of the very severe cases seven were greatly improved; two were in Group D, three in group C (a) and the other two were in group B (b). No relation could therefore be traced between the degree of improvement and either the total dose given, the administration of a loading dose or the duration of treatment.

Table 3 shows the result of treatment in relation to the duration of the disease.

TABLE 3.

Duration	Cured	Greatly Improved	Slightly Improved	Failed
1st week—catarrhal stage	..	1	..	4
2nd week	..	11	9	12
3rd week	1	8	2	4
4th week	..	..	..	1

Most of the cases in the catarrhal stage (80 per cent) failed to improve. On the other hand, of the thirty-two cases in the second week of the disease, eleven cases (about 30 per cent) were greatly improved. And of fifteen cases in the third week, one was cured and eight (less than 50 per cent) were greatly improved. This, together with the absence of any exact correlation between the degree of improvement and the dosage schedule, leads us to suspect that much of the improvement was due to spontaneous variations in the course of the disease rather than to the administration of the drug.

Cases with Complicating Bronchopneumonia. There were seven such cases in the series: three developed it in the second week of the disease, of these two failed to improve and one was slightly improved. Another three cases developed it during the third week of the disease and of these one was cured and two greatly improved. The last case, which developed bronchopneumonia in the fourth week of the disease, failed to improve. Thus in all the cases, although the effect on bronchopneumonia was favorable the disease itself was variable.

Toxicity. Apart from vomiting and sometimes diarrhea, no untoward side effects were noted.

SUMMARY

1. Fifty-three cases of whooping cough were studied.

2. The age ranged from under three months to nine years.

3. The duration varied from those in the catarrhal stage to those in which the spasmodic cough was evident for two weeks or three.

4. Mild as well as very severe cases were tried on different dosage schedules.

5. One case was cured, an infant ten months old, who had the disease for three weeks and then developed bronchopneumonia; the attack was mild.

6. In twenty-one cases the drug failed to influence the course of the disease.

7. Twenty cases were greatly improved and eleven cases only slightly so. But even in these two categories, no relation could be traced between the improvement and either the duration of the disease, the dosage used or the severity of the case.

CONCLUSION

In view of the still prohibitive cost of the drug in Egypt, of the difficulty in administration and of the results of this investigation we believe that aureomycin treatment of pertussis still leaves much to be desired.

It is a pleasure to thank Prof. Khalil Bey, director of the Department, for his kind help and criticism.

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CLINICAL REVIEW

In order to encourage the writing of clinical articles by recent graduates or senior medical students, the ARCHIVES *will publish monthly at least one such paper from the classes of Doctor Reuel A. Benson, New York Medical College, New York, and Doctor Philip Moen Stimson, Cornell Medical School, New York. Other interested medical schools are cordially invited to submit student papers for consideration.*

INFANTILE CORTICAL HYPEROSTOSES*

REPORT OF CASE AND SUMMARIZATION AND EVALUATION OF ALL OTHER REPORTED CASES

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In 1939, Caffey,[1] endeavoring to stress the nonspecific nature of roentgenographic changes in syphilitic infants, presented a series of 22 illustrative cases. These cases illustrated a sound point, namely, that the characteristic skeletal changes, which are usually associated with syphilis, are not conclusively diagnostic, and, further, are simulated by a wide variety of infantile conditions.

That this theme was worthy of emphasis was shown by subsequent developments. Case 19 of his series described an infant with multiple cortical hyperostoses of the long bones of the extremities, the ribs and the clavicles. Clinical and laboratory findings were not suggestive of any known disease or syndrome. In the following six years, Caffey collected three additional cases, which seemed to fit in the same category, and in 1945 published a paper[2] postulating a new disease entity which he termed "infantile cortical hyperostoses."

Concurrently, Smythe[3] and his associates were studying a similar group of patients which they reported in 1946 together with a series of cases described in the world literature which might fit into this newly defined syndrome.

Caffey issued a supplementary report[4] in 1946 in which six additional cases were added to his series. At the annual meeting of the American Pediatric Society in Atlatnic City, N. J. in 1949, Caffey presented a paper[5] which pointed out that the clinical picture and

*Submitted as partial fulfillment of the requirements of the course in Senior Pediatrics at the New York Medical College, Flower and Fifth Avenue Hospitals, New York.

roentgenological findings of chronic vitamin A poisoning closely resembled that of infantile cortical hyperostoses. Furthermore, in re-evaluating his reported series, he found that in two patients described as having cortical hyperostoses the bone changes were secondary to vitamin A excess.

Since the syndrome described by Caffey and Smythe is still in its scientific infancy it would not be amiss to report another case similar to those previously described and endeavor to recapitulate the nature of the disease and elucidate the criteria of its diagnosis.

REPORT OF CASE

The patient, (E. V., No. 4288), a Puerto Rican female infant, was born December 20, 1949, after an uneventful pregnancy and labor. The infant weighed 2.7 kilograms and was apparently normal. The child was breast fed from birth and did well. At one month, vitamin supplements were added and the child was spoon fed six drops of cod liver oil only, each day. Orange juice was also added; however, appearance of an eczema precluded its continued use and 50 mgm. of ascorbic acid once each day was substituted. The child has received these supplements daily since their introduction into the diet.

At two and a half months the infant was switched to an evaporated milk formula (water 23 ounces, evaporated milk 13 ounces, 2 tablespoonfuls Dextri-Maltose). Tomato juice, carrots, Pablum and banana were also added. The child was a good feeder and showed a constant weight gain. At one month the child developed "pain in the stomach," which was diagnosed as colic and rapidly responded to treatment.

At approximately 14 weeks (one month prior to admission), the child developed a swelling over the lower border of the right mandible. The mother reports that the child did not seem feverish, continued to eat well, but was irritable. This swelling subsided in three days; however, four days later a similar diffuse swelling appeared over the lower border of the left mandible. This persisted for four days then disappeared spontaneously. One week after this episode the left mandible again became swollen as before, continued so for several days and again subsided.

As the mandibular swelling regressed, the right wrist and forearm became swollen and tender. The child became irritable and

attempted to splint the arm. The mother again states that the child was not "feverish" and while the swelling subsided for two days, it rapidly reappeared to persist and result in the parents seeking medical advice. Hospitalization ensued.

Family History. The family history was negative for syphilis and tuberculosis. None of the child's three siblings had ever presented a similar swelling or bony deformity.

Physical Examination revealed an irritable crying baby with a mild rhinitis and slight cough. The pharynx was moderately injected and minimal adenopathy of the neck was found. There was a slight mucoid nasal discharge. Ear drums were clear. There were no further abnormal findings other than a smooth firm enlargement of the distal one-third of the right ulnar bone.

Laboratory Studies. The admission hemogram was hemoglobin 70 per cent (10.9 gms.), R.B.C., 4.5 million, W.B.C., 11,800 with 42 per cent polymorphonuclears, 54 per cent lymphocytes (8 immature), 2 per cent monocytes, 2 per cent plasma cells. Five days later a repeat study showed hemoglobin 58 per cent (9.0 gms.), R.B.C., 3.2 million, W.B.C., 7,600 with 34 per cent polymorphonuclears, 59 per cent lymphocytes (3 immature), 6 per cent monocytes, and 1 per cent plasma cells. There was a slight achromia and macrocytosis. The microsedimentation rate was 31 mm. per hour and this level was maintained in repeat studies. The alkaline phosphatase was 23.1 King Armstrong units. Serum calcium was 12.2 mgm.%, serum phosphorus 5.12 mgm.%. Vitamin C level was 1.14 mgm.%. Eagle Wassermann, Eagle flocculation and Kahn were all negative. The urine was consistently negative for glucose, albumin, acetone and indican, and of normal specific gravity range.

Agglutination studies were performed using as antigen typhoid H and O, paratyphoid A & B, Brucella abortus and proteus OX-19. All were negative in a 1:20 dilution. The Mantoux reaction was negative in dilutions of 1:10,000 to 1:100.

Roentgenographic Examination disclosed an irregular periosteal reaction present at the distal half of the right ulna with a small area of cortical erosion of the distal one-third of the same shaft. Examination of the skull, mandible, pelvis, and both upper and lower extremities showed no evidence of osteal or periosteal pathology. Examination of the chest revealed a homogeneous shadow in the paracardiac region which had the appearance of enlarged

thymus gland. Heart was normal in size and shape and both costophrenic angles were clear.

Course in Hospital. The child's hospital course was uneventful. The temperature curve was essentially afebrile although a slight elevation was noted on admission. No therapy was instituted beyond the use of regular vitamin supplements. All workups being negative, the child was discharged in virtually the same status as on admission and will be followed regularly at the clinic.

COMMENT

There are too few cases reported thus far to permit the establishment of valid statistics and hard and fast diagnostic criteria; however, even now certain facts and trends evidence themselves persistently and a review of these trends is in order. The criteria herein suggested should be considered temporary in that they are deduced from a short series, and it is hoped that further reporting of cases will elucidate their truth or falsity.

The factors discussed below have been obtained by reviewing Caffey's series[2, 4] with the exclusion of the two cases which are now felt to be vitamin A poisoning, and by a review of Smythe's series[3] excluding, arbitrarily perhaps, the two cases in older children. This, including the herein presented case, makes a total of 14 cases.

History: Parents are reported as of being of normal good health without any evidence of prenatal food or vitamin deficiencies in the mother. Eleven cases had normal uneventful deliveries, two patients were delivered by caeserean section and one patient by forceps.

Thus far there does not appear to be any sex prediliction, with half of the patients being males and the other half females. Questioning in relation to siblings did not reveal any history of such episodes in their childhood.

The age of onset in the cases being considered was almost invariably in the first six months of life. There is some doubt that occurence of a similar picture in older infants represents the same ill defined syndrome.

The onset is marked tender swellings, single or multiple, which may wax and wane day by day. The mandibular swelling is particularly characteristic and a history of same should be carefully sought.

Constitutional symptoms are generally reported as minimal. When present, they usually consist of low grade fever, general irritability, and not infrequently, a mild upper respiratory infection. The most characteristic clinical finding is the soft tissue and skeletal lesion. The soft tissues over the area affected are swollen and tender to touch. The swelling seems deeply placed, not immediately subcutaneous, and does not show a localized calor or rubor.

The skeletal lesions themselves vary greatly in number, magnitude and in diversity of sites. It is interesting to note that while metatarsals and metacarpals have not been shown to be affected in infantile cortical hyperostoses, both of these sites have shown hyperostotic lesions in vitamin A poisoning.

In Caffey's original series of four cases,[2] pleurisy was a common finding and three of the four patients had a pleural exudate roentgenologically. This seems to occur chiefly in patients with extensive hyperostoses of the rib cage. In several early cases it has been observed that the soft tissue swelling precedes cortical changes demonstrated by x-ray. Repeated studies at intervals may later show the typical pattern of hyperostoses.

In some cases the lesions are monostotic and are at first considered as primary malignant tumors. Coley[6] has seen four instances of this, the scapula being the site in three cases and the mandible in one.

Many of these patients have evidenced febrile courses, but the fever in general is irregular when present and an inconsistent finding. At least one of Caffey's cases, as well as our own case, has been afebrile.

In all patients the disease appears to run a self-limited course with eventual subsidence of the lesions. Spontaneous exacerbations and remissions occur. One patient, who evidenced the syndrome shortly after birth, had sequelae at four years nine months. Penicillin, sulfonamides and vitamin supplementation do not appear to have any retarding or regressing influence.

Laboratory findings have likewise been minimal, and when deviations have occurred, they have been inconsistent and of a lesser magnitude. Serological tests for syphilis and agglutination studies have all been negative. Urinalysis has been persistently negative with few exceptions.

Anemia is a fairly common finding, although not present in

every case. It is not usually a severe anemia, but has in several cases required transfusion. There also appears to be a leukocytosis with counts ranging commonly from 10,000 to 25,000, but cases with normal white counts are encountered. Calcium and phosphorus studies are usually within normal limits. Alkaline phosphatase has been reported as moderately elevated in several cases. The erythrocyte sedimentation rate tends to be increased, usually in the vicinity of 30-40 mm. in one hour. Both higher and lower values have been encountered.

Biopsies of affected bones have shown only a lamellar hyperplasia of cortical bone without evidence of inflammatory process or subperiosteal hemorrhage. Smythe[3] biopsied the swollen tissue as well and reports to a moderate proliferation of sarcolemma cells throughout the section, and some lightly basophilic mucoid degeneration of the intermuscular connective tissue. Associated with the latter was a generalized proliferation of connective tissue. There was some evidence of muscle cell degeneration and atrophy. There was no sign of inflammatory reaction, and nerves and vessels were normal. The pathologic diagnosis was fibrosis, degeneration and atrophy of skeletal muscle.

Roentgenographic findings are characteristically those of thickening of scattered bones and overlying soft parts. The basic change is in the external thickening of the cortex in a lamellar-like fashion. This lamellation usually spares the terminal parts of the shaft. There are no spurs or fractures. The metaphysis, spongiosa and epiphyseal centers and plates are unaffected. As mentioned, previously, metatarsals and metacarpals have not been demonstrated to be affected thus far. Bone lesions may be single or multiple.

In our case, as well as in three patients included in Smythe's report, a mediastinal shadow suggestive of thymus was found. The significance of this finding has not been determined.

SUMMARY

The history of the development of a potentially new syndrome entitled "infantile cortical hyperostoses" has been reviewed.

A new case has been reported, thus increasing the series of recently published cases to fourteen.

An attempt has been made to clarify some of the factors which may aid in diagnosis of this syndrome and elucidate the nature of the disease.

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CHLORAMPHENICOL IN CHILDREN WITH TYPHOID. (South African Journal of Clinical Science, Cape Town, 1: 149, Sept. 1950). Feldman and Selby report on 12 children who were treated for typhoid in Johannesburg. Typhoid in the Bantu child may be confused with meningitis. A macroscopically clear spinal fluid in a patient with a stiff neck and a positive Kernig sign makes one suspect tuberculous meningitis. Headache and abdominal pain are frequent observations in both tuberculous meningitis and typhoid. In the former, however, the patient is usually irritable, resents handling and tends to lie curled up in bed. Children with typhoid, on the other hand, are usually quiet, apathetic and lie supine. Coated tongue and a doughy abdomen are differentiating points. In the treatment of typhoid, various sulfonamides, penicillin and streptomycin have been used singly and in combination. Their only value appears to have been in diminishing the possibilities of infection with secondary invaders. Ten of the 12 children here discussed were given adequate doses of chloramphenicol. Although the dramatic effects reported by some observers were seen only in some patients, all were benefited by the use of chloramphenicol. Clinical improvement, as evidenced by diminished toxicity, improvement in appetite and disappearance of headache and abdominal pain, was noted in all the treated patients in two to six days. Defervescence occurred in an average of 5.1 days. In the fully treated patients, an average of 26.8 Gm. of chloramphenicol was administered over an average period of 17.1 days. In most cases an initial oral dose of 1 to 2 Gm. was followed by 0.25 Gm. at four-hour intervals.—*Journal A.M.A.*

PEDIATRICS HALF A CENTURY AGO

From time to time the Archives, which was the first Children's Journal in the English language, will reprint contributions by the pioneers of the specialty over fifty years ago. It is believed that our readers will be interested in reviewing such early pediatric thought.

THE TWENTY-THREE HOUR TREATMENT*

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This paper contains but one idea, presents for consideration but one point. If anyone shall inquire what the words of the title mean, what the cure, and why twenty-three, that inquiry, I may say, justifies the title.

When I urge my patients to keep a sick or convalescent child in the open air many hours each day, just as many hours as rain, snow and harsh high winds will permit, I am always answered with the most complacent of smiles, with a manner of triumphant satisfaction, "So we do; we do just that." I have talked myself to a standstill over and over again trying to impress parents and nurses with the fact that two hours in the morning and an hour and a half in the afternoon is not all day, and not enough, that the long hours of the night count for something (*in the way of fresh air*), that to get the good of the air the child must live in it. It must sleep, eat, frolic, spend twenty-three of the twenty-four hours in good, cool, fresh outdoor air. I have the habit of speaking of it as twenty-three hour treatment, or the twenty-three cure. This in a crude way seems to suggest what I want. They begin by asking, Why not twenty-four hours? What is to be done with the other hour? If they do so ask it is the first gleam of light that they can be moved by persuasion, and are not of clayey consistence. Talking into a claybank kills.

I submit it as an inquiry: Is it not the everyday experience for the fresh-air-favoring physician on entering unexpectedly the sick room or convalescent's apartment to find the air exhausted, moist, malodorous, "mousy," and then in direct sequence to listen to the

*Read before the Eighteenth Annual Meeting of the American Pediatric Society, held at Atlantic City, N. J., May 30, 1906.

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best of excuses for its being in this condition. Is it not so? It would seem that a special training must have been given to nurses for furnishing ready-made excuses for foul air and omission to ventilate. They have three reasons for housing a child to one for taking it out. For the twenty-three cure the nurse should be expert in everything but excuses.

A young child of fifteen months had recovered from a twelve days' bronchopneumonia. She had been treated, as a certain reprint has told most of this audience, in constant cold air in winter. Before her sickness and after it she was backward, had scurvy, and still had rickets. She was always pale, flabby, pot-bellied, perspiring and unable to stand. The excellent nurse who cared for the child during pneumonia left after convalescence was established, and the child was returned to the untrained but faithful attendant. All my directions as to living in best obtainable air ended in explanations and excuses. The child was not improving. She was what the sailors navigating in equatorial waters would call in the doldrums. She made no progress in any direction. In desperation I demanded the former nurse's return, and promptly put into execution what for the first time I designated twenty-three hour treatment.

The apartment in which the child lived was on the fifth floor, cornering on a broad avenue and a street leading straight into the Park. The corner room had three windows to the west and two to the south. In the middle of this large room in its carriage lived the pale convalescent all the hours of daylight. The months were February and March, the season stormy and about average temperature. The room was shut off from the rest of the house and swept with breezes. Incidentally, this condition of cold precluded guests from making long calls and from fatiguing the child.

It is unnecessary to say that the child acquired an appetite, digested its food, took on healthful color of the cheeks, slept, gained strength, learned to walk, and in every way developed into a normal child, catching up rapidly to the scheduled requirements of her age. The facts more important to mention are that she did not catch cold. In truth, before the winter had softened into spring she was facing into the raw winds of April, and every way resisting and ignoring the temperature, which no one in this

room would enjoy without previous hardening to it. Quite as interesting is the total indifference the nurse acquired to the cold. Her white nurse's dress seemed strangely out of keeping with the range of the thermometer. The little girl has continued to *live* the twenty-three cure ever since. She makes cotton pies (snow) before open windows with an extra wrap of only a little shoulder shawl. All day and all night her room is swimming with outdoor air and she has not required a doctor's prescription from that day to this. This is an example of the twenty-three hour treatment in a child of approximately two years.

A second example is in an infant one month old. The infant having attained the age of four weeks, the accoucheur permitted his charge to pass to the care of the family physician. It chanced that in this case the physician who was to care for it was a specialist who devoted his whole life to the care and feeding of infants and young children, and the infant was bottle fed from the outset. No conditions of environment or individual association bore upon the case, however, in the accoucheur's mind. It may be that by arbitrary enactment of the specialist accoucheurs, the time for relinquishing their bottle-fed babies may, in the future, be set at first dentition, closing of the fontanel, or at puberty. The infant had been kept in a room temperature of 70° to 72° F., carefully guarded from draughts, which means the ingress of fresh air, fed on a prescription made up in the house from the quart jar of milk of the family supply. The baby is said to have done fairly well.

Be that as it may, the infant which came into my care was not a proud specimen, was thin, barely gaining at all, jumping and jerking, and sleeping indifferently. The family were extremely anxious about him, which means at least that to them the infant was not doing very well. The prescription for milk was more or less uncertain in ingredients, but I was sure that it was made up each day alike by an excellent nurse, that it was producing passages which, though not perfect, were apparently becoming better gradually, and that probably the best I could do in the delicate situation was to leave the feedings unchanged for a few days.

Since it did not thrive on modified milk I resolved to modify the baby. I inaugurated a living in improved quality of air. The month was December and the child four weeks old. Delicate

to an extreme degree would be the words to express the child's condition.

To restate the proposition: the infant was four weeks old, the month was December, the indications in regard to its care required the twenty-three hour treatment. I may add the house was very large, facing south, situated half a block from Central Park, on a wide street. What is more to the point, the nurse was excellent, and in the end I voted her the best nurse I have ever known.

Gradually the windows were opened, the doors into halls closed, the crib, which stood at first in the far corner, was gradually advanced to the open windows, and finally, after a couple of weeks, the infant was put in a laundry basket with an improvised carriage hood, and passed out on the balcony. Family friends who knew the baby's delicate beginning of life were horrified, for the weather was about average for December. The whole proceeding was frankly pronounced brutal, and predictions of awful accidents filled the conversations of chance callers. The father, who had a slight suspicion that this new boy baby was going to be a great pride to his family name (and the baby's first name hinted at rare links in famous historic lineage), had unconfessed anxieties and groans all to himself. For a few days the advance was slow and uncertain. At least nothing happened. Then the father's face cleared a little, and the nurse's face wore an expression of quiet courage, and even of hope.

A month later. Scene on the first morning after a snow storm: morning bright, snow gleaming, wagon wheels whistling and groaning. Baby near the window, wrapped in its blankets, basket and window showing evidence of the nurse's intentions. In due time the window opened and snapped shut, and the baby was out for his airing. The father, whose future lawyer or soldier son was thus punched out into the elements in a thirty-five-cent laundry basket, was discovered hovering near, and the only expression which escaped him was, "Ah, the poor little man!" and he departed. The thermometer on the casement near the basket registered 10° F. I saw it myself.

I mention these incidents because they belong to the subject. I make no mention of drugs, for he never has had any except one or two doses of castor-oil. When the father disappeared, leaving

his child in the basket alongside a thermometer registering 10° F., and could raise no protest, only murmur, "Poor little man!" the day was won. The baby must be thriving.

So it was. The boy gained, slept, piped for his meals and slept again. The room was swimming with air. On rainy and snowy days he was brought just within the dry spots on the balcony, and when the gusts of rain became boisterous he was brought in, and the thirty-five cent laundry basket was placed on a low table between two windows. There never was a northeast storm in midwinter, or a combination of snow, rain, slush or sleet, which kept him from having all the bracing effect which comes of cold, fresh flowing air.

Result. During his little life, now of nearly seven months, he has not lost more than one day of feedings. He had no colds, he regularly gained, all his functions were normal, and no one would ever call him delicate. He has lost all that nervousness, is simply very bright, almost too bright and alert for his own good, and is round, plump, happy, normal.

For twenty-three hours each day he has lived in the cold air. The twenty-fourth has been devoted to bathing. It is simply astonishing to what he became accustomed. He would lie on the bed without extra cover and kick and shout in a cold room in which one not accustomed to it would fear to loiter.

During the winter nearly everybody in the house had influenza—the nurse, mother, three other children, the nursemaid, butler, and all the parlor and kitchen maids. The only person who escaped and apparently enjoyed it as a joke was the party in the basket. Every day and every night was the same to him. His nurse, streaming at the eyes and nostrils, might run away to sneeze, might cough till her eyes bulged. To him all was a joke. He loved company, and they might groan with pain and make mouths from sore swallowing apparatus, he cooed and gurgled, and thought it all fun. The last word from the country is, "He's fit to burst his skin from fat."

SUMMARY

(1) The twenty-three hour cure or twenty-three hour treatment consists in living twenty-three out of the twenty-four hours in the best obtainable cool flowing fresh air.

(2) The treatment is especially excellent in convalescence from acute illness, in cases of delicate infants and young children not thriving.

(3) The quality of cold or cool flowing fresh air is essential. Cold air may be stale. Air may be oxygenated and free of odors and yet be warm. The air should be flowing freely and cold.

(4) Cold fresh flowing air has uniformly certain effects upon young patients. First they sleep. They remain quiet so long as they are in the open air, and sleep most of the time. The quieting effect is well proved. Second, they take more food and assimilate it better.

(5) Patients in the open air rarely catch cold, much less often than those kept habitually in warm rooms. Something depends on the nurse, of course, but in a wide experience with different nurses selected by chance, the patients have rarely caught cold. In the whole winter's experience at Sea Breeze no child has developed pneumonia.

Finally, this paper does not intimate that the writer is the only one who practices the twenty-three cure. Everyone professes to advise fresh air. It is hoped in this paper to "standardize" fresh air, to estimate its dosage. The main interest is to shorten the conversation of the persistent mother or nurse who shall have, in spite of us, begun that endless list of explanations and excuses.

If the twenty-three treatment is accepted and once fairly begun, it is not probable that the physician will be obliged to talk into the claybank of indifference and misunderstanding on the part of the family and to his own discouragement and exhaustion.

SPLENECTOMY IN ESSENTIAL THROMBOPENIA IN CHILDREN. (Maandschrift voor Kindergeneeskunde, Leyden, 18: 65, 1950). Stahlie discusses the pathogenesis of essential thrombopenia in children and reviews the various treatments, pointing out that splenectomy is the only causal therapy. He shows on the basis of seven case histories that splenectomy is rarely indicated in children, as the disease shows a tendency to spontaneous cure even after long periods (more than two years). Splenectomy should not be done in cases of simple hypoplasia of the megakarocytes.—*Journal A.M.A.*

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*Pennypacker, T. G., and Steinmetzer, C. A., *J. Philadelphia General Hospital* 2:0 (Jan.) 1951.

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